Modeling L1 acquisition

What happens if we try to put together some of the models and proposals related to the phonetics/phonology interface and L1 acquisition that we have been looking at?

I. Ideas we have discussed in the course that relate to L1 acquisition

- *(Not discussed in this course in detail, but widely assumed in OT acquisition work:)* Initial State ranking is **M>>F**; an **M>>F** "bias" persists in the course of reranking (following work by Tesar/Smolensky/Prince; Demuth 1995, Gnanadesikan 1995, etc.)

- (Some) rankings among **F** constraints are determined by the P-map (Steriade 2001)

    - *Alternative:* Phonetic grounding may be diachronic in origin (Hyman 2001, Blevins & Garrett 2004), so there may be no need to impose universal rankings on the **F** constraints internal to the phonological grammar

- The P-map (and therefore **F** rankings) may change over time as the learner's perceptual abilities change under the influence of the language being acquired (Hallé et al 1998; Moreton & Amano 1999; Maye and colleagues)

- The constraints in CON are constructed by the learner (Hayes 1999)

- The learner can identify the phonetic categories (surface segments) of the language, and the distinctive features, through stochastic learning (Maye and colleagues)

- The perception grammar and the production grammar are subject to different rankings, and acquisition of perception precedes acquisition of production (Pater 2004)

II. Some questions

- Relating Hayes to Maye: Does the identification of a relevant phonetic feature lead to the creation of **M** and/or **F** constraints related to that feature?

- Relating Pater to Maye: Does the identification of a phonetic category (segment) represent a demotion of **M** below **F**(AS)?

- Relating Hayes, Pater, Maye: What occurs during the first time an infant "perceives" a segment, if no category has yet been formed and no relevant **M** or **F** constraints exist?

III. Working with a "toy phonology"

(1) Segments that appear in the surface phonetic representation:

p	t	k	i	a	u
b	d	g			
m	n	ŋ			
f	s	x			
	ʃ				

(2) Allophonic alternations:

- [b d g] appear after nasals. [p t k] appear elsewhere.
- [ʃ] appears before [i]. [s] appears elsewhere.

(3) Syllable structure:

- (C)V(C) — optional onsets; codas permitted; no clusters

(4) Features needed to distinguish the consonant categories

	p	t	k	b	d	g	m	n	ŋ	f	s	ʃ	x
cons	+	+	+	+	+	+	+	+	+	+	+	+	+
(son)	-	-	-	-	-	-	+	+	+	-	-	-	-
nas	-	-	-	-	-	-	+	+	+	-	-	-	-
voi	-	-	-	+	+	+	+	+	+	-	-	-	-
cont	-	-	-	-	-	-	-	-	-	+	+	+	+
Lab	+			+			+			+			
Cor		+			+			+			+	+	
ant		+			+			+			+	-	
Dors			+			+			+				+

(5) Some relevant constraints

(a) **F**: MAX-SEG; DEP-SEG; IDENT-*f* (for all features *f*)

(b) **M**: Context-free **f* constraints for all features? (Gouskova 2003: maybe not)

(c) Featural **M** constraints: — simplification: C only; ignore V feature violations

(i) Feature co-occurrence within one segment

*[-son, +cont]	(NOFRICATIVES)	
*[-son, +voi]	(NOVOICEDOBSTRUENTS)	
*[-ant]	(NOPOSTALVEOLARS)	
*Lab	(NOLABIALS)	\ combined effect:
*Dors	(NODORSALS)	/ no non-Cor place

(ii) Sequential constraints

*[+nas][-son,-voi]	(*NT)
*[+nas][-son,+voi]	(*ND)
*[+cont,+ant][i]	(PAL-[i])

(d) Syllable-structure constraints: Ignore for now